PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project
Walla Walla River Basin Monitoring and Evaluation Project

BPA project number: 20127

Contract renewal date (mm/yyyy): 10/1999 ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Confederated Tribes of the Umatilla Indian Reservation

Business acronym (if appropriate) CTUIR

Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses
4.2A, 4.3C.1, 7.1A.2, 7.1C.3, 7.1C.4, 7.1D.2

FWS/NMFS Biological Opinion Number(s) which this project addresses
N/A

Other planning document references
Wy-Kan-Ush-Mi Wa-Kish-Wit, Volume I, 5b-13 (CRITFC 1995)
Wy-Kan-Ush-Mi Wa-Kish-Wit, Volume II, pages 42-45, and 52-54 (CRITFC 1995)
Walla Walla River Basin Restoration Master Plan (CTUIR 1998)
Northeast Oregon Hatchery Project, Walla Walla Hatchery Program (CTUIR 1993)

Short description
Monitor and evaluate natural spawning, rearing, life histories, age and growth characteristics, and genetic characteristics of adult steelhead and their natural progeny in the Walla Walla River Basin (monitoring will include spring chinook starting in 2004).

Target species
Summer Steelhead, Bull Trout, Spirng Chinook Salmon

Section 2. Sorting and evaluation

Subbasin
Walla Walla

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☒ Anadromous fish ☐ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☐ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☐ Operation & maintenance ☐ New construction ☒ Research & monitoring ☐ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
20138	Design and Construct NEOH Hatchery for Walla Walla	Our project will measure the success of this project in terms of increased natural production
20319	Walla Walla Fish Passage Operations	Our project will measure the success of this project in terms of increased natural production
9601100	Juvenile Fish Passage Improvements – Walla Walla River	Our project will measures the success of project No. 9601100 in terms of increased natural production
9601200	Adult Fish Passasge Improvements – Walla Walla River	Our project will measure the success of project No 9601200 in terms of passage success (FY2001) and increased natural production
9604601	Walla Walla Fish Habitat Enhancement	Our project will measure the success of project No. 9604601 in terms of increased natural production
9901100	Assess Fish Habitat & Salmonids in Washington (WDFW)(sub-proposal submitted separately)	was in umbrella table

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met objectives
1998	M & E Plan - Through coordination with ODFW & WDFW, developed a M&E plan to address the urgent information needs first	Yes

	and move into secondary information needs in following years. Additional M&E objs to be added following spring chinook reintroduction expected to start in 2001 with adults returning to Walla Walla River in 2004	
1998	Temperature monitoring - Monitor water temperatures throughout the Walla Walla River Basin in coordination with other CTUIR, WDFW, ODFW and USFS projects. Water temperature data has been useful in estimating the suitability of stream reaches for salmonid production and in understanding current salmonid life histories .	Yes

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Monitor spawning activities of summer steelhead in the Walla Walla River Basin.	a	Examine existing spawning survey data collected in the Walla Walla Basin
		b	Develop index areas to monitor steelhead spawning
		c	Document the number and location of redds, and examine carcasses in index areas and throughout the basin as conditions allow.
		d	Estimate survival to spawning and total egg deposition.
		e	Collect and record length, sex, pre and post spawn mortality data, coded wire tags, marks, fin clips and scales from the carcasses examined.
		f	Bag, label, freeze and deliver snouts (if any) to the appropriate research laboratories for analysis.
		g	Digitize and summarize data, report findings, and discuss management implications
2	Estimate juvenile salmonid abundance and rearing densities in selected stream reaches in the Walla Walla River Basin.	a	Electrofish selected stream reaches using block-nets and depletion methods to estimate salmonid densities and abundance in priority areas as defined by the Management Oversight Committee.
		b	Digitize and summarize capture data, estimate densities and abundance, examine trends, report findings and discuss management implications.
3	Monitor stream temperatures in the Walla Walla River Basin in cooperation with other monitoring agencies	a	Meet with other agencies to coordinate temperature-monitoring activities.
		b	Deploy Vemco Minilog thermographs in April of 2000. Check status and

			function of thermographs in July
		c	Retrieve thermographs in November. Download, summarize and graph data. Examine trends, report findings and discuss management implications.
4	Determine age and growth of bull trout and steelhead in the Walla Walla River Basin.	a	Take scales from juvenile and adult steelhead during trapping, electrofishing and spawning surveys.
		b	Mount and press adult scale samples. Place juvenile scales directly between labeled acetate sheets at the time of sampling.
		c	Determine the proportion of unmarked adult salmon that are of hatchery and natural origin based on circuli counts from the scale focus to the first annuli.
		d	Determine the years of freshwater and saltwater rearing of adult natural steelhead.
		e	Digitize and summarize data, report findings and discuss management implications.
5	Improve and update the monitoring and evaluation strategies for the Walla Walla River Basin. Coordinate with the Management Oversight Committee to ensure an effective M&E program.	a	Meet with administrators, managers and researchers to determine monitoring and evaluation needs.
		b	Modify and develop the monitoring and evaluation program to meet identified needs.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measurable biological objective(s)	Milestone	FY2000 Cost %
1	00/1999	00/2010			30.00%
2	03/1999	11/2010			30.00%
3	03/1998	11/2010			10.00%
4	03/1999	10/2010			20.00%
5	03/1998	12/2010			10.00%
				Total	200.00%

Schedule constraints

This is a long-term monitoring project. Scheduling changes would not affect the ongoing steelhead monitoring of wild steelhead. However, delays in implementing the Walla Walla Hatchery for steelhead supplementation and spring chinook reintroduction would delay related tasks for monitoing those programs under this project.

Completion date

The completion date is unknown. This is a long term monitoring project that is reviewed annually by the Management Oversight Committee. We expect this project to be reduced to a streamlined monitoirng program at some time in the future, but the activities are subject to the information needs of the Management Oversight Committee.

Section 5. Budget

FY99 project budget (BPA obligated): 48,000

Approximately $48,000 will be utilized for this project in FY1999. Funding was administered through project No. 9000501

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	2 FTE	%50	77,878
Fringe benefits	29%	%14	22,585
Supplies, materials, non-expendable property		%6	9,200
Operations & maintenance		%0	0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		%0	0
NEPA costs		%0	0
Construction-related support		%0	0
PIT tags	# of tags: 0	%0	0
Travel		%5	7,450
Indirect costs	34%	%25	39,818
Subcontractor		%0	0
Other		%0	0
TOTAL BPA FY2000 BUDGET REQUEST			$156,931

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
CTUIR	Summer Youth, Bio-Aids	%8	14,400
		%0	
		%0	
		%0	
Total project cost (including BPA portion)			171,331

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$203,000	$208,000	$213,000	$263,000

Section 6. References

Watershed?	Reference
☐	Black, E. C. 1953. Upper lethal temperatures of some British Columbia freshwater fishes, J. Fish. Res. Board of Canada 10(4):196-210
☐	Brett, J. R. 1952. Temperature tolerance in young Pacific salmon, genus Oncorhynchus. Journal of the Fisheries Research Board of Canada 9(6):265-323.
☐	Buchanan, David V., Mary L. Hanson, Robert M. Hooton, Status of Oregon's Bull Trout.

	Oregon Department of Fish and Wildlife. Portland, OR 97207.
☐	Byrne, Alan; T. C. Bjornn, J. D. McIntyre. 1992. Modeling the response of native steelhead to hatchery supplementation programs in an Idaho River. North American Journal of Fisheries Management 12:62-78.
☐	CRITFIC, 1995. Wy-Kan-Ush-Mi Wa-Kish-Wit, Spirit of the Salmon, The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakima Tribes, vols I & II. Columbia River Inter-Tribal Fish Commission, Portland, Oregon
☐	Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 1994. Umatilla Basin natural production monitoring and evaluation project. Draft Annual Report 1992-1993. DOE/BP-75347-1, Bonneville Power Administration, Portland Oregon.
☐	Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 1998. Walla Walla Rive Basin Fisheries Restoration Master Plan - Draft. CTUIR, P.O. Box 638, Pendleton, Oregon 97801.
☐	Contor, C. R., E. Hoverson, P. Kissner. 1995. Umatilla Basin natural production monitoring and evaluation project. Annual Report 1993-1994. DOE/BP-75349-1, Bonneville Power Administration, Portland Oregon.
☐	Contor, C. R., E. Hoverson, P. Kissner, J. Volkman. 1996. Umatilla Basin natural production monitoring and evaluation project. Annual Report 1994-1995. DOE/BP-75349-2, Bonneville Power Administration, Portland Oregon.
☐	Contor, C. R., E. Hoverson, P. Kissner, J. Volkman. 1997. Umatilla Basin natural production monitoring and evaluation project. Annual Report 1995-1996. DOE/BP-75349-3, Bonneville Power Administration, Portland Oregon.
☐	Contor, C. R., E. Hoverson, P. Kissner. 1998 (in press). Umatilla Basin natural production monitoring and evaluation project. Annual Report 1996-1997. DOE/BP-75349-4, Bonneville Power Administration, Portland Oregon.
☐	Contor, C. R., E. Hoverson, P. Kissner. 1999 (in preparation). Umatilla and Walla Walla Basins natural production monitoring and evaluation project. Annual Report 1997-1998. DOE/BP-75349-5, Bonneville Power Administration, Portland Oregon.
☐	Hubbard L. E., T. A. Herrett, R. L. Kraus, G. P. Ruppert, M. L. Courts. 1995. Water resources data, Oregon, water year 1994. US Geological Survey, Water-Data Report OR-94-1, U.S. Department of the Interior. 473 pp.
☐	Nielson, Reed S. 1950. Survey of the Columbia River and its tributaries. Report prepared for the United States Department of the Interior, Report No. 38.
☐	Northwest Power Planning Council (NPPC). 1987. Columbia river basin fish and wildlife program. Northwest Power Planning Council, 850 S.W. Broadway, Suite 1100, Portland, Oregon 97205.
☐	Northwest Power Planning Council (NPPC). 1990. Umatilla River subbasin salmon and steelhead production plan. Northwest Power Planning Council and the Agencies of the Indian Tribes of the Columbia Basin Fish and Wildlife Authority.
☐	Northwest Power Planning Council (NPPC). 1994. Columbia River Basin Fish and Wildlife Program. Northwest Power Planning Council, Portland Oregon 97204
☐	Oregon Department of Fish and Wildlife (ODFW). 1987. United States vs. Oregon subbasin production reports. Portland, Oregon.
☐	Stein, Carter. 1998. Editor. 1998 PIT tag specification document. Columbia River Basin PIT Tag Information System data source input specifications. Pacific States Marine Fisheries Commission. Gladstone, Oregon.
☐	Taylor, George H. 1993. Normal annual precipitation, state of Oregon, Period 1961-1990. Map. Oregon Climate Service, 326 Strand Ag. Hall, Oregon State University, Corvallis, Oregon.
☐	U.S. Geological Survey (USGS). 1989. Hydrological unit map, State of Oregon. U.S. Geological Survey, Reston, Virginia.
☐	Van Deventer, John S., William S. Platts. 1989. Microcomputer software system for generating population statistics from electrofishing data- User's Guide for MicroFish 3.0. USDA. U.S. Forest Service, Intermountain Research Station. General Technical Report INT-254 29 pp.

☐	Vincent, E. Richard. 1987. Effects of stocking catchable-size hatchery rainbow trout on two wild trout species in the Madison River and O'Dell Creek, Montana. North American Journal of Fisheries Management 7:91-105.
☐	Walker, George W., Norman S. MacLeod. 1991. Geologic Map of Oregon, U.S. Geological Survey, U.S Department of the Interior. U.S. Geological Survey Map Distribution, Box 25286, Federal Center, Denver, CO 80225.

PART II - NARRATIVE

Section 7. Abstract

Our project goal is to provide information to managers and researchers working to restore anadromous salmonids to the Walla Walla River Basin. Ongoing and completed projects include a hatchery, dam removal, new ladders and screens, and instream flow enhancement. This project, in cooperation with WDFW (Assess Fish Habitat and Salmonids in Washington, project No. 9010), monitors the restoration of naturally producing salmon and steelhead in the basin. Through coordination meetings, WDFW will operate on the Washington side of the Basin and we will operate primarily on the Oregon side. The project objectives are to measure, estimate and report steelhead spawning success, rearing densities and abundance, and age and growth characteristics. In the future, this project will evaluate and monitor habitat quantity and quality, adult passage facilities, smolt migration timing and survival, and salmonid life history characteristics. This project also monitors water temperatures in coordination with WDFW, ODFW, USFS and other CTUIR projects.

Researchers and managers from throughout the basin will examine and modify the project during coordination meetings. We strive to provide the best information for adaptive management of local steelhead (and salmon in the near future). The information generated by this project also has utility for salmonid restoration efforts throughout the Columbia River Basin.

While certain monitoring activities are conducted each year, others objectives have been deferred to future years through prioritization, need, and limitations in personnel and funding. Physical habitat surveys, outmigrant surveys, adult passage facility evaluations and genetic monitoring are examples of this. Genetic samples from endemic steelhead will be collected in the Walla Walla Basin in 1999 (allozyme and mtDNA). Geneticists will use both electrophoresis and DNA techniques to begin examine steelhead throughout the Walla Walla Basin. This genetic information will be useful in evaluating supplementation options for endemic steelhead. Additional genetic monitoring may occur again in 2009.

We communicate findings to researchers and managers through formal reports, oversight committee meetings, annual basin operation meetings, and formal presentations at various conferences and forums.

Section 8. Project description

a. Technical and/or scientific background

Project Background

This project is under a "Proposal Umbrella" with a WDFW research project. Our two projects work cooperatively to monitor and evaluate the current status of the Walla Walla steelhead population. In the future, we will monitor the success of the salmon restoration and steelhead enhancement efforts. CTUIR will monitor natural production throughout the basin, but we will concentrate primarily on the Oregon side. WDFW will monitor natural production on the Washington side of the basin, and they will concentrate primarily in the Touchet River sub-basin. In the future ODFW will evaluate hatchery operations and juvenile passage facilities (after facility construction). Together, these four projects will

comprehensively monitor and evaluate natural and hatchery salmonid production in the Walla Walla River Basin.

The need for monitoring the natural production of salmonids in the Walla Walla River Basin developed with efforts to restore natural populations of spring chinook salmon, (*Oncorhynchus tshawytsha)* and enhance summer steelhead (*O. mykiss*). The need for restoration began with agricultural development in the early 1900's that extirpated salmon and reduced steelhead runs. The most notable developments were the construction and operation of Burlingame, Nursery Bridge, Little Walla Walla and Marie Dorian Dams. These irrigation projects (and more than 25 others) block migrating salmon and de-water the Walla Walla River. The Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife are developing the Walla Walla Hatchery Master Plan. Plans include the restoration of spring chinook salmon and improvements of the summer steelhead. This project is providing valuable informaion for the hatchery planning effort. Monitoring of natural production will continue following hatchery construction and operation.

This monitoring project began in 1998 when the Umatilla Natural Production Monitoring and Evaluation Project was expanded to the Walla Walla River Basin (FY1998 and FY1999). However, the Walla Walla monitoring effort will be a separate project in FY2000. This project is one of at least eight subprojects in the Walla Walla Fisheries Restoration Program (see section 8.c.). Our team is the only project evaluating the natural production of steelhead in the Oregon side of the basin. We evaluate how natural production goals for salmon and summer steelhead are being achieved. We provide specific information regarding natural spawning, rearing, migration and harvest to aid adaptive management.

We conduct core-monitoring activities each year as well as two and three-year projects that address special needs for adaptive management. Examples of these projects include adult passage evaluations (FY2001 through FY2003) and genetic monitoring (FY1999).

Location Description

Spring chinook salmon were present in the Walla Walla River Basin in the 1800s. Currently, the headwaters are in good condition and could support spring chinook. The lower reaches of the Walla Walla Basin are primarily agricultural lands. Topography, annual precipitation and vegetation gradually changes from dry farms and range-lands (bunchgrasses, wild rye and sagebrush) of the lower elevations to the wetter forests of the Blue Mountains (white fir, mixed conifers and shrub under-stories). The Walla Walla River Basin in northeast Oregon and southeast Washington has a drainage area of 1758 square miles. The Walla Walla River originates on the northwest slopes of the Blue Mountains, south and east of Walla Walla, Washington, and flows 79 miles in a westerly direction to the Columbia River at RM 315. The Walla Walla River hydrologic unit number is 17070102 (USGS 1989). The mouth of the Walla Walla River at Wallula Junction is at approximately 340 feet (above mean sea level). The headwaters are as high as 6,063 feet. Mean annual precipitation ranges from 15 inches/year at Touchet to 65 inches/year in the headwaters near Squaw Peak (Taylor 1993).

The basin can be roughly divided into two physiographic regions. The lower river, west of Walla Walla , has cut a low valley into a broad upland plain called the Deschutes-Umatilla Plateau. Multiple layers of middle Miocene basalt flows dominate the parent geologic materials of the plain. East of Walla Walla, foothills and the Blue Mountains dominate the region. Lifting, faulting and folding of volcanic, sedimentary and metamorphic rock created the Blue Mountains. The river and streams have cut steep sided canyons into the layers of rock that form the higher elevations of the Blue Mountains.

b. Rationale and significance to Regional Programs

This project is the measuring tool of natural production restoration efforts in the Walla Walla River Basin as outlined in the NPPC Columbia River Basin Fish and Wildlife Program (measures 4.2A, 4.3C.1, 7.1A.2, 7.1C.3, 7.1C.4 and 7.1D.2; NPPC 1994). The Walla Walla Basin fisheries restoration program is developing through planning and implementation efforts of CTUIR (1998), BPA (fish and wildlife plan) and

NPPC. We provide detailed information regarding the natural spawning, rearing and migration success of bull trout, resident rainbow and summer steelhead. This project will monitor and evaluate adult steelhead and salmon passage after construction of the new ladders. We will also evaluate the natural production success of spring chinook when restoration begins. Four-year-old adults are expected to begin returning to the Walla Walla River 2004. This project's fundamental purpose is to measure the success of salmon and steelhead restoration efforts and provide information for adaptive management. The information we provide also has utility for restoration efforts throughout the Columbia River Basin.

c. Relationships to other projects

This project is an integral part of the Walla Walla Basin Restoration Efforts. It is the logical monitoring component to measure the natural production benefit from the projects outlined below.

This project is in a "Proposal Umbrella" with the WDFW research project "Assess Fish Habitat and Salmonids in Washington" project No. 9010. Two ODFW research projects will be added which will include a Walla Walla Hatchery monitoring and evaluation project and a juvenile-by-pass facility evaluation project in FY2001.

Closely related projects include:
Watershed Enhancement and Rehabilitation Projects
Walla Walla Fish Habitat Enhancement, CTUIR, Project No. 9604601
Hatchery Construction and Operations Projects
Design and Construct NEOH Hatchery for Walla Walla Basin, CTUIR, new project number.
Hatchery Operation and Maintenance, CTUIR, project No. 8343500
Passage Facility Construction and Operation on the Walla Walla River
Walla Walla Fish Passage Operations, CTUIR, new project number.
Juvenile Fish Passage Improvement – WW River, CTUIR, Project No. 9601100.
Adult Fish Passage Improvement – WW River, CTUIR, Project No. 9601200.

We will need the Columbia Basin PIT Tag Information System, project No. 9008000, to coordinate and store PIT tagging, interrogation and detection data when we begin smolt survival monitoring.

During 1998 and 1999 this project had joint objectives with the Umatilla Basin Natural Production Monitoring and Evaluation Project. For FY 2000 some of our personnel will work part time on the Walla Walla project and part time on the Umatilla project

We will forward all observations of bull trout to ODFW and WDFW. Data may include bull trout rearing densities, distribution, abundance, age and growth, and the location and timing of spawning. In fact, a significant portion of the data reported by Buchanan (et al. 1997) was collected by this project. We will also provide the Pacific Lamprey Research and Restoration Project, No. 9506000 with any information we collect on juvenile and adult lamprey.

d. Project history (for ongoing projects)

This project began in 1998 and is in its second year (FY2000 will be the third year). The project's work history is summarized by year with dates, project numbers, contract numbers, costs, project reports and documents.

Work History by Year

Year One: October 1, 1997 through September 30, 1998, BPA project no. 90-005-01, contract no. DE-B179-(92BP75349), projected cost was $546,000 and actual cost was $436,000 (cost included Umatilla M&E)

Reports and documents: BPA Proposal, statement of work, annual report (Contor et al. 1999 in prep.) and quarterly reports.

Activities (1997-1998) included all Umatilla monitoring and evaluation activities and expanding the project to include the Walla Walla Basin. We developed a Walla Walla monitoring plan and began monitoring waters temperatures in coordination with other agencies.

Year Two (Current Year): October 1, 1998 through September 30, 1999, BPA project no 90-005-01, contract no. DE-B179-(92BP75349) and projected cost is $609,799 (cost includes Umatilla M&E).

Reports and documents: BPA Proposal, statement of work, annual report (Contor et al. 2000 in prep.) and quarterly reports.

Planned activities (1998-1999) include conducting M&E work in both the Umatilla and Walla Walla Basins (Umatilla and Walla Walla M&E projects will be separate projects in FY2000). For the Walla Walla Basin we will continue to improve the monitoring plan, continue temperature monitoring, collect samples for genetic studies, and begin salmonid abundance and spawning surveys.

e. Proposal objectives

Proposal objectives are listed in section 4 above and with the methods and hypotheses in section 8 (f), immediately below.

f. Methods

Objective 1. Monitor spawning activities of summer steelhead in the Walla Walla River Basin. This is a monitoring objective with an underlying hypothesis that adult spawning will increase as a direct result of ongoing restoration efforts. This objective will expand to include spawning surveys of chinook salmon when adults begin to return in 2004

Task 1.1 Examine existing spawning survey data from the Walla Walla Basin.

Task 1.2 Develop index areas to monitor steelhead spawning.

Task 1.3 Document the number and locations of redds and examine carcasses in index areas and throughout the basin as conditions allow.

Task 1.4 Estimate survival to spawning and total egg deposition.

Task 1.5 Collect and record length, sex, pre and post-spawn mortality data, coded wire tags, marks, fin clips, and scales from carcasses examined.

Task 1.6 Bag, label, freeze and deliver snouts to the appropriate research laboratories for analysis.

Task 1.7 Digitize and summarize data, report findings and discuss management implications.

Objective 1. Methods

This objective will began in the spring of 1999 and will be ongoing. We will conduct spawning ground surveys to enumerate summer steelhead redds and sample mortalities in various reaches of the Walla Walla River Basin. We'll repeat surveys in areas with spawning or holding adults. Other areas will be surveyed fewer times if few spawners are observed. Poor water conditions may also prevent surveys. We wear polarized glasses to assist observation. We will not probe debris jams or throw rocks into holding pools to minimize stress on prespawning salmonids. Two surveyors will walk three to four miles daily. They will walk alone along the margins of the smaller tributaries or together on opposite banks of larger streams.

Redds will be judged to be complete based on redd size and depth, location, and amount and size of rock moved. All redds will be reviewed by our most experienced surveyors for consistency. Redds will be marked with orange flagging labeled with the date, location, species and number of males and females observed on or near redds. Crews will also record information in data books. For each redd, surveyors will record the stream name, location, dates redds were first observed, sex and number of fish observed on or near redds, carcasses sampled in the areas, and habitat type.

Carcasses found during the survey will be measured from the middle of the eye to the hypural plate (MEHP). Fork length will also be recorded if severe caudal fin erosion has not occurred. We will describe obvious injuries and attempt to determine the cause of death in prespawning salmonids. We will cut open carcasses to determine egg retention of the females and spawning success of the males. Prespawning mortality is defined as death of a fish before spawning. Females with egg retention estimated

near 100% and males with full gonads will be classified as prespawning mortalities. Tails of sampled fish will be removed at the caudal peduncle to prevent re-sampling. We'll collect snouts from salmon and steelhead with coded wire tags (based on fin clips) by cutting through the head from behind the orbit and down to the mouth. Snouts will be placed in plastic bags and given an individual snout number for identification. Snouts and accompanying biological data will be sent to ODFW's, Mark Process Center in Clackamas for coded wire tag extraction and reading.

Objective 2. Estimate juvenile salmonid abundance and rearing densities in selected stream reaches in the Walla Walla River Basin. This is a monitoring program with an underlying hypothesis that distribution and rearing densities of natural juvenile salmon and steelhead will increase through rehabilitation efforts. In addition, before implementing steelhead supplementation, managers would like information on the current distribution, density and abundance of salmonids.

Task 2.1 Electrofish selected stream reaches using block-nets and depletion methods to estimate salmonid densities and abundance in priority areas as defined by the Management Oversight Committee.

Task 2.2 Digitize and summarize capture data, estimate densities and abundance, examine trends, report findings and discuss management implications.

Objective 2. Methods

We will use backpack electroshockers to sample juvenile salmonids. Block-nets will be used to contain the fish within a measured area. Salmonids will be captured with dip nets and removed on successive electrofishing passes until a depletion rate of at least at 60% is achieved. The same individual will sample both passes in a similar manner for the same number of seconds (or slightly more). Electroshocker settings (i.e. volts, pulse) will remain constant for each removal pass. Additional passes will not be conducted if salmonids are neither captured nor observed during the first pass.

Captured salmonids will be placed in a livewell until the completion of all passes. Fish will be identified to species, measured (fork length, mm) and inspected for fin clips, brands or marks. We will record injuries, signs of disease or stress. Juvenile spring chinook salmon will not be differentiated from juvenile fall chinook salmon. Anadromous rainbow will not be differentiated from resident rainbow.

Crews will collect scale samples from a wide variety of fish sizes for age and growth determinations. We will remove approximately 6-12 scales from an area two scale rows above the lateral line, posterior to the dorsal fin, and anterior to the adipose fin. Scales will be mounted in the field directly onto clear mylar envelopes. Stream name, site, date, species and fork length will be recorded on the mylar. No additional handling or mounting will be required before reading.

Estimates of salmonid abundance will be calculated with a maximum-likelihood model (Van Deventer and Platts 1989) from the number of salmonids captured during successive electrofishing removal passes. Densities will be estimated by dividing estimated salmonid abundance by measured wetted channel area.

Objective 3. Monitor stream temperatures in the Walla Walla River Basin in cooperation with other monitoring agencies. This is a monitoring objective with an underlying hypothesis that watershed rehabilitation efforts will improve water temperature profiles over time. Knowing temperature profiles throughout the basin provides critical insight to the salmonid rearing potential of the basin.

Task 3.1 Meet with other agencies to coordinate temperature monitoring activities.

Task 3.2. Deploy Vemco Minilog thermographs during April of 2000. Check status and function of thermographs in July.

Task 3.3 Retrieve thermographs in November. Download, summarize and graph data. Examine trends, report findings and discuss management implications.

Objective 3. Methods

This objective began in 1998 and is ongoing. CTUIR, ODFW, U.S. Forest Service (USFS) and WDFW coordinate the deployment of thermographs in the Walla Walla River Basin to maximize consistency and coverage without duplicating effort. We initialize, download and deploy the thermographs in the office or field with a portable computer. Steel chains or cables anchor the units to large trees or boulders on the shore. Thermographs and cables are concealed to minimize tampering. Crews take

photographs and write detailed descriptions of each thermograph location. We also draw vicinity maps and mark 7.5 minute topographic maps. Temperature data will be examined in relation to past data, water quality standards, and critical levels published in the literature (Black 1953, Brett 1952).

Objective 4. Determine age and growth of bull trout and steelhead in the Walla Walla Basin. We hypothesize that through a better understanding of age, growth and life history characteristics of Walla Walla Basin salmonids, best management alternatives can be developed and employed to maintain and enhance salmonids.

Task 4.1 Take scales from juvenile and adult bull trout and steelhead during trapping, electrofishing, and spawning surveys.

Task 4.2 Mount and press adult scale samples. Place juvenile scales directly between labeled acetate sheets at the time of sampling.

Task 4.3 Determine the proportion of unmarked adult salmon that are of hatchery and natural origin based on circuli counts from the scale focus to the first annuli.

Task 4.4 Determine the years of freshwater and saltwater rearing of adult natural steelhead.

Task 4.5 Digitize and summarize data, report findings and discuss management implications.

Objective 4. Methods

We will take five scales from the preferred area (two scale rows above the lateral line on the left side of the fish in a diagonal line between the posterior edge of the dorsal fin and the anterior edge of the anal fin). Because of the high incidence of regenerated scales on adults, we will also take scales from the other side of the fish two rows below the lateral line in the preferred area). We will mount adult scales on gum cards and press them into cellulose acetate. Length, sex and species are kept with each scale sample. We will collect approximately ten scales from each juvenile salmonid sampled in the preferred area. Scales will be spread out between folded strips of labeled mylar. Adult and juvenile scales will be analyzed under a microfiche reader at magnifications of 42x and/or 72x.

We will age scales with the European Method of age designation: (i.e. age 1.2 denotes a fish that migrated from freshwater during its second year of life and spent two winters rearing in the ocean). One or two readers will examine all scales. Two readers will examine scales with questionable ages. Differences in age interpretation will be discussed. If a clear interpretation can not be determined, the scale will be eliminated from the sample.

Objective 5. Improve and update the monitoring and evaluation strategies for the Walla Walla River Basin. Coordinate with the Management Oversight Committee to ensure an effective and adaptive monitoring and evaluation program. This objective is based on the underlying assumption that the best adaptive monitoring program is maintained when research and management regularly explore, evaluate and prioritize monitoring needs.

Task 5.1 Meet with administrators, managers and researchers to determine monitoring and evaluation needs.

Task 5.2 Modify and develop the monitoring and evaluation project to meet identified needs.

Objective 5. Methods

The methods are sufficiently defined in the tasks above

g. Facilities and equipment

Some existing equipment from the Umatilla Basin Natural Production Monitoring and Evaluation Project will be available for use for the Walla Walla Project. New equipment purchases will be minimal.

Office Space and Equipment includes: work area; desk, chairs and file cabinet; bookshelf; Pentium II computer with current hardware, software and printer; two locking storage cabinets, and two locking indoor storage areas with shelves.

GSA Vehicle is a 4X4 Dodge pickup with a two-way radio. A fenced lot with locking gates is available for vehicle storage.

Field Equipment available for use includes two rafts, three Model 12 Smith-Root backpack electroshockers with batteries and chargers, two, five-foot in diameter, E.G. Solution rotary screw traps, four large winches for trap adjustment. Additional equipment includes one four wheeler, two trail bikes, two wet suits, two dry suits, associated gear, two dive lights, two ATV trailers, three box traps, 4000 Watt generator and power tools.

Cameras and Instruments available for use include six Ryan RTM2000 thermographs, 15 Vemco Minilogger thermographs (we will purchase 10 more in 1999), four Suunto clinometers, four Suunto mirror compasses, four mass scales and two range finders. Radio telemetry equipment includes five LOTEK SRX 400 telemetry receivers, associated dry boxes, cable and antennas. Camera equipment includes one digital camera, three film cameras, two Panasonic time lapse VCR recorders, and two Panasonic video cameras with lenses, tripod and power supplies (for passage monitoring). The project also has a EyeCom 3000, full size COM reader (for scale analysis) and a Micronta electronic multi-tester;

h. Budget

Personnel costs are based on the equivalent of 2 full time employees. Wages are set and follow similar range and step schedule as federal employees. Project costs will increase somewhat in FY2001 and in FY2004 when additional objectives are added (adult passage evaluations (radio-telemetry), chinook spawning surveys and smolt migration and survival studies. Additional increases in personnel costs occur each year through the cost of living adjustments (COLA). COLA rates are based on inflation. Our estimates for out-year costs reflect the addition of objectives and the COLA increases. Fringe benefits and indirect costs (29% and 34% respectively) are set by CTUIR administration and can not be changed at the program or project level. Costs for services and supplies include repair, office supplies, communication charges, and field equipment. The travel budget is for a GSA vehicle (rental, mileage and insurance) and per diem for personnel to attend training meetings and present findings out of town.

Section 9. Key personnel

Key personnel will be hired at the beginning of FY 2000 (October 1999); until then, the project will be managed by the following individuals.

Gary James
Fisheries Program Manager

Education
Graduated 1979, Oregon State University
Bachelor of Science Degree in Fisheries

Employment
1982 – Present, Fisheries Program Manager (0.08 FTE) Confederated Tribes of the Umatilla Indian Reservation. Duties: manage Tribal Fisheries Program; supervise project leaders and coordinate salmonid restoration and enhancement efforts among various agencies and projects for the Umatilla, Walla Walla, John Day, Grande Ronde and Imnaha River Basins.

Craig R. Contor
Project Leader

Education
1986-1988. Idaho State University, Pocatello, Idaho. Graduated with a Master of Science degree in Biology (Fish Ecology) in May of 1989

1983-1986. University of Idaho, Moscow, Idaho. Graduated with a Bachelor of Science degree in Fishery Resource Management,

1981-1983. Peninsula College, Port Angeles, Washington. Transferred to the University of Idaho with credits in general science, math, and writing.

Fisheries Related Employment
1993-1998, Project Leader, Umatilla and Walla Walla Basins Natural Production Monitoring and Evaluation Projects (0.16 FTE). Confederated Tribes of the Umatilla Indian Reservation, Pendleton Oregon. The project leader coordinates and supervises activities that include salmon and steelhead spawning surveys, habitat surveys, age and growth determinations, and estimating salmonid survival, abundance and distributions. Additional tasks include coordinating efforts with ODFW, USFS and WDFW, analyzing data, writing reports, hiring personnel, training and evaluating personnel, developing and tracking budgets and expenditures, and developing work plans, proposals, sample designs and sampling protocols. .

1992-1993, Fisheries Researcher, Idaho Department of Fish and Game, Eagle, Idaho.

1990-1991 Fisheries Project Biologist, Idaho Power, Department of Environmental Affairs, Boise, Idaho.

1988-1990 Fisheries Technician (NTE), U. S. Forest Service, Intermountain Research Station, Boise, Idaho.

1986-1988, Idaho State University, Research Assistant and Volunteer Teaching Assistant.

1984-1985, Bio-Aid, Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho.

Certificates of Training
Regular CPR and First Aid Training 1988-1998
Open Water SCUBA Diving Certificate, 1991
Open Water SCUBA Rescue Diver Training, 1991
IFIM training, 1991, IFIM 200, 201 and 310.

Awards
1989, Certificate of Merit, Awarded for Superior Performance in the Evaluation of the COWFISH Model, USFS, Intermountain Research Station.

1989, Special Award for Outstanding Research and Conservation Efforts, from the Henry's Fork Foundation.

1985, Outstanding Senior, Fishery Resources, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho 83843.

Recent Project Reports
Senior author of six Umatilla Basin Natural Production Monitoring and Evaluation Project Annual Reports, 1992-93 through 1998.

Section 10. Information/technology transfer

We provide information through Oversight Committee meetings, quarterly reports, annual reports, and formal presentations at various conferences and forums. We provide raw data and summarized data on diskette to managers and researchers upon request. Our information assists managers and researches in

adaptively managing local steelhead and salmon stocks. Our findings could also apply to salmonid restoration efforts throughout the Columbia River Basin.

Congratulations!